Spot Safety Project Evaluation

Project Log # 200512176

Spot Safety Project # 07-96-013

Spot Safety Project Evaluation of the Flashing Traffic Signal Installation At the Intersection of SR 1716 (Murphy School Rd) at SR 1713 (Mount Herman Church Rd) / SR 1841 (Cornwallis Rd) Orange County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ 03-20-2006
Brad Robinson, EI Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 07-96-013 – The Intersection of SR 1716 (Murphy School Rd) at SR 1713 (Mount Herman Church Rd) / SR 1841 (Cornwallis Rd), Orange County

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after study has been completed to measure the effectiveness of the spot safety improvement. Additional analysis methods were not utilized for this evaluation because a suitable comparison group was unattainable. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of an overhead flashing traffic signal. SR 1716 (Murphy School Rd), SR 1713 (Mount Herman Church Rd), and SR 1841 (Cornwallis Rd) are all 2-lane roads with no turn lanes. The speed limits are 45 mph for SR 1841 and SR 1713, and 55 mph for SR 1716. The subject location is a 4-leg intersection controlled by oversized stop signs on SR 1841 and SR 1713. Both SR 1714 and SR 1841 have advanced stop ahead signs, and SR 1716 has advanced intersection warning signs. After conducting a site investigation it was noted that the SR 1713 approach does not have a stop bar.

A citizen initially requested the study. In a letter he stated that he continually witnessed vehicles running the stop signs and was concerned for the safety of his family.

There were a total of 4 crashes reported during the initial study from 2/1/1993 to 1/31/1996, with 3 involving vehicles running through the stop signs. The final completion date for the flashing traffic signal installation at the subject intersection was on December 18, 1998, with a total cost of $6,000.

Naïve Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from November 1, 1998 to January 31, 1999. The before period consisted of reported crashes from March 1, 1992 through October 31, 1998 (6 Years, 8 Months) and the after period consisted of reported crashes from February 1, 1999 to September 30, 2005 (6 Years, 8 Month). The ending

date for this analysis was determined by the available crash data at the time the crash analysis was conducted.

The treatment data consisted of all crashes within 150 feet of the subject intersection. Please see attached *Location Map* for further detail. The following data table depicts the Naive Before and After Analysis for the treatment intersection. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information

	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	6	7	16.7
Total Severity Index	16.1	15	-6.8
Frontal Impact Crashes	6	6	0.0
Frontal Severity Index	16.1	17.3	7.5
Crashes Involving a Running of the Stop Sign	3	1	-66.7
Volume	1600	2800	75.0

The naive before and after analysis at the treatment location resulted in a 16.7 percent increase in Total Crashes, no change in Frontal Impact Crashes and a 75 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1994 and the after period ADT year was 2000.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in 16.7 percent increase in Total Crashes and no change in Frontal Impact Crashes. There was a significant increase in ADT (75.0%). The summary results above demonstrate that the treatment location appears to have had an increase in Total Crashes while Frontal Impact Crashes stayed constant from the before to the after period.

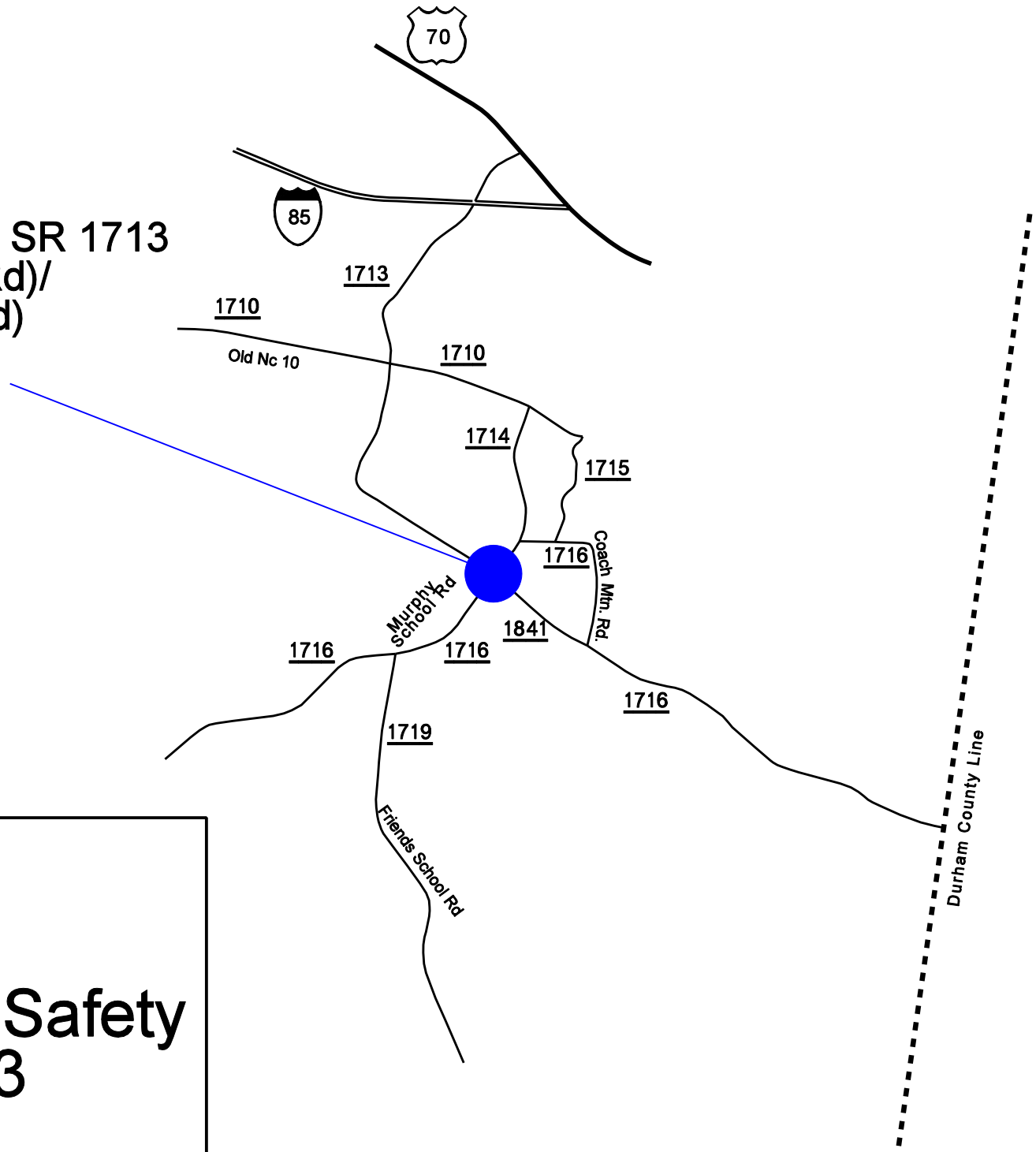
Referencing the *Collision Diagrams,* all 6 before period crashes were Frontal Impact Crashes. Three of the 6 (50%) involved a vehicle running the stop signs. In the after period, 6 out of 7 Total Crashes were Frontal Impact Crashes. Only 1 of the 7 (14.3%) crashes involved a running of the stop sign, a 66.7 percent decrease (3 to 1) from the before period. From this data it appears that the flasher installation decreased the running of the stop sign despite the high increase in ADT (75%)

Again referencing the *Collision Diagrams*, there does not appear to be any significant pattern of crashes at the intersection in the before period. In the after period, a pattern of crashes is emerging involving vehicles travelling northwest on SR 1841 (Cornwallis Rd) and southwest on SR 1716 (Murphy School Rd). There does not appear to be any site distance issues looking from Cornwallis Rd. (see *Treatment Site Photos*).

Please see the attached *Treatment Site Photos*. Photos are provided for all four approaches to the intersection along with site distance photos from both stop conditions.

The countermeasure crash reduction for Total Crashes at the subject intersection is a 16.7 percent increase in crashes. The countermeasure crash reduction for Frontal Impact Crashes at the subject intersection is a 0.0 percent decrease in crashes. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors.

Treatment Location:
SR 1716 (Murphy School Rd) at SR 1713
(Mount Herman Church Rd)/
SR 1841 (Cornwallis Rd)



Location Map
Orange County
Evaluation of Spot Safety
Project # 07-96-013

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TREATMENT SITE PHOTOS TAKEN 3/9/2006

Traveling East on SR 1716 (Murphy School Rd)

Traveling West on SR 1716

Traveling North on SR 1841 (Cornwallis Rd)

Traveling South on SR 1713 (Mount Herman Church Rd)

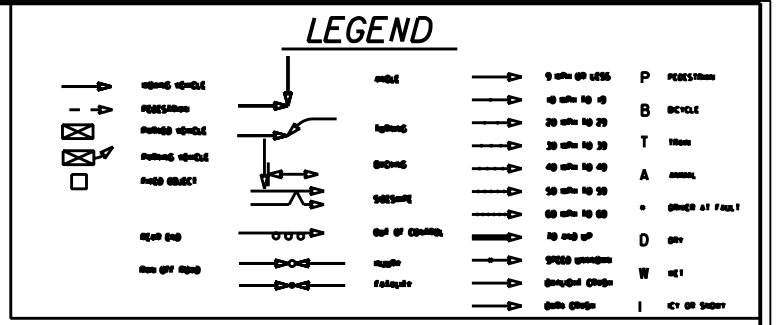
Looking Right from SR 1841 (Cornwallis Rd)

Looking Left from SR 1841

Looking Right From SR 1713 (Mt. Herman Church Rd)

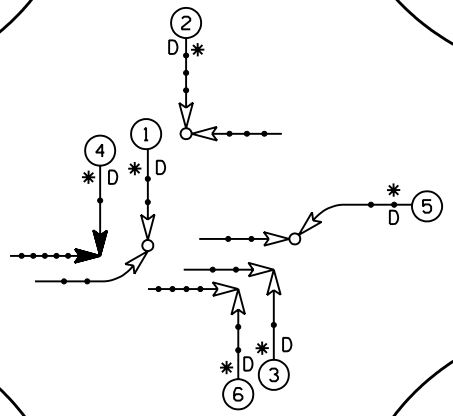
Looking Left From SR 1713 (Mt. Herman Church Rd)

Orange County
SR 1716 (Murphy School Rd) at
SR 1713 (Mount Herman Church Rd)/
SR 1841 (Cornwallis Rd)
In the Before Period
From 3/1/1992 to 10/31/1998



SR 1716
(MURPHY SCHOOL RD.)
45 MPH

SR 1713
(MOUNT HERMAN
CHURCH RD.)
55 MPH



SR 1841
(CORNWALLIS RD.)
55 MPH

SR 1716
(MURPHY SCHOOL RD.)
45 MPH

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY

COLLISION DIAGRAM

DIVISION: 7	AREA: ..
STUDY PERIOD:	3/1/1992 TO 10/31/1998
DISTANCE:	Y-LINE: 150 FT
ANALYSIS PREPARED BY:	B. Robinson
DIAGRAM PREPARED BY:	B. Robinson
DIAGRAM REVIEWED BY:	----------
SCALE:	NOT TO SCALE
DATE:	February, 2006
LOG NUMBER:	20051216

BEFORE ELASHER INSTALLATION

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH

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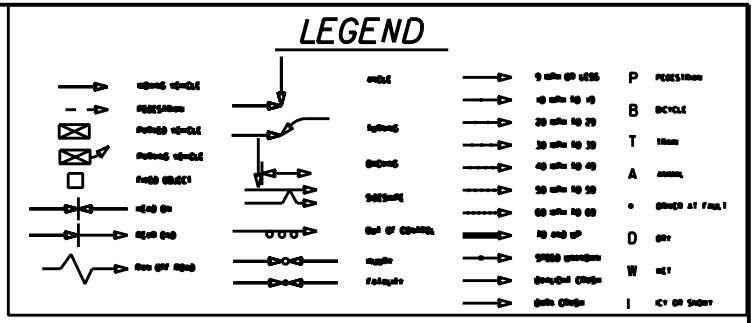
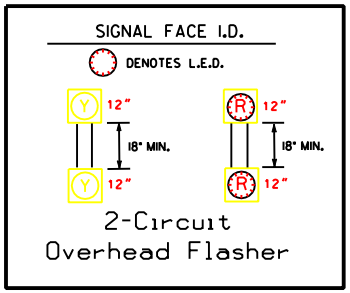
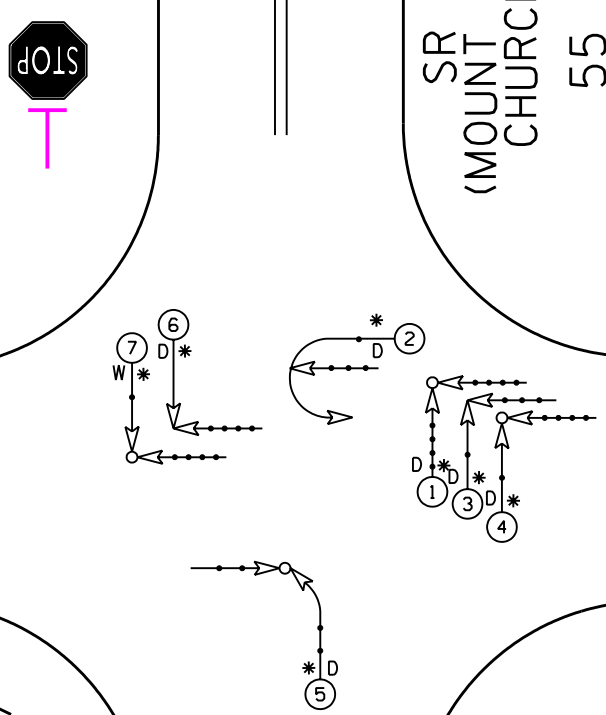
Orange County
SR 1716 (Murphy School Rd) at
SR 1713 (Mount Herman Church Rd)/
SR 1841 (Cornwallis Rd)
In the After Period
From 2/1/1999 to 9/30/2005







TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY

AFTER_FLASHER_INSTALLATION

COLLISION DIAGRAM

DIVISION: 7	AREA: ..
STUDY PERIOD:	2/1/1999 TO 9/30/2005
DISTANCE:	Y-LINE: 150 FT
ANALYSIS PREPARED BY:	B.Robinson
DIAGRAM PREPARED BY:	B.Robinson
DIAGRAM REVIEWED BY:	----------
SCALE:	NOT TO SCALE
DATE:	February 2006
LOG NUMBER:	20050176

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

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